

**Minimum Equipment Performance Standards and Preventive
Maintenance Required Under This Contract**

Gearless Traction Elevators:

Frequency of Inspections: Every Two (2) Weeks

Each Inspection must be signed for by the Owners Representative.

1. Specific Equipment Performance Standards:

- a. Call-Backs: Nominally six (6) to possibly eight (8), excluding nuisance calls, per year average per elevator.

If Door Light Ray is Used:

- b. Door Operator: The door closing speed must be within the limits of the current ASME A17.1 Elevator Safety Code. On car calls, doors can close 0.9 to 1.6 seconds after the last passenger clears the light ray. To close, four (4) to seven (7) seconds after the last person has cleared the light ray. If variable car call and hall call time are used, the hall calls should be set for walking distance at upper floors.

If Load Weighing is Used for Dispatching (Use percentage of Load for Dispatching):

- c. Nudging: Effective after twenty (20) seconds +/- 10%, depending on traffic patterns. The doors should close, with a buzzer sounding, stopping only when the Saf-T-Edge is collapsed and then the doors should not reopen. If the manufacturer's manual has specific procedures, then the manual should be followed.
- d. Call Response Time: The nominal expectations is that a call will be answered in an average waiting time of twenty-five (25) to thirty (30) seconds when all cars are in operation. Should the average corridor waiting time exceed forty (40) seconds with all cars running, a system failure is possible and the cause should be investigated. If all cars are not running during any peak period then the reason should be investigated.
- e. Annual Test: The Elevator Contractor shall perform all tests as required by ASME A17.1 Elevator Safety Code. The Contractor will be expected to assist the building maintenance personnel and Elevator Inspectors selected by management in making a check of the system performance semi-annually. The Contractor will be expected to make all corrections on the inspection report within thirty (30) days of receipt of the report.
- f. Floor Levels: The car is to be level in accordance with manufacturer's specifications. But in no case shall the unit be out of level over + or - ¼" one-fourth of an inch.

Check Chart:

2. Minimum expected periodic servicing, checking, oiling, and adjustments: If your standard requires more frequent checks it should be posted on your check chart.
 - a). Every Two (2) Weeks: Ride car, check operation and correct problems found.
 - b). Every Two (2) Weeks: Observe operation of control, machine, brake motor, and mg set, clean and adjust as needed. Check lubrication of machine motor and mg set.
 - c). Every Thirteen (13) Weeks: Check call response of supervisory control, test and record rectifier voltages of supply, governor and governor tail sheave, normal landing switches, door operator, hoistway door adjustment, check all cables, adjust, correct and lubricate as required.
 - d). Every Twenty-six (26) Weeks: Clean and examine Saf-T-Edge, roller guide shoes, lubricate, adjust and correct as necessary.
 - e). Every Fifty-two (52) Weeks: Clean and check all control stations, car and corridor, clean and check hoistway switches, control and relay panels, all electrical connections should be checked to see that they remain tight, clean and check hoistway doors 2nd through top floor, check all safety equipment to see it operates freely, lubricate and adjust as needed. Full brake check, oil and adjustment.
 - f). Other: Machine bearings should be drained, oil leaks sealed, flushed and refilled each year. The door operator gear case should be drained, flushed and refilled every five (5) years.
3. Doors and Door Operation: Frequency of inspections and adjustment covered above.
 - a). Car and Hoistway Doors: Clean and Lubricate track and hangers as needed. Check backplate and hanger to door fastenings, and relating devices to insure tightness. Check up-thrust adjustment and fastenings (nominal 0.010" to track), should clearance exceed 0.035" it should be adjusted. Door relating cables should be taut enough that they do not sag in normal opening and closing of the doors but provide some flexibility in door reversal to reduce the shock of reversal on the door hanger cables and fastenings. Door interlock adjustment to be set to permit the latch to drop within 3/8" or less of full closure. Check and tighten non-vision wings or sight guards at each inspection. Check spirator adjustment to insure that doors will close without any aid or power applied yet not interfere with Saf-T-Edge reopening action. Car door contact should be set to prevent car movement unless the door is 2" or less from full closure.
 - b). Car door safety device should be checked quarterly for freedom of movement which will allow the safety device to operate with even a somewhat glancing blow, but not sloppy

permitting it to rub against door. Where there is a retractable projection at opening, it should be slightly in front of the door and should permit the door to be held in the open position with pressure on the edge, in closing, edge should permit door to reopen within 1-1/2" of full closure or less. Reopening action should be such that reversal of the door movement will occur at such a point or before the leading edge of the vane and door are in the same plane (i.e. at or before the complete collapse of the edge). Action contact line of the edge should be free of cuts or bulges. Control contact cable and retracting cable, where used, should be held clear of snagging on other moving parts. Maintain car door kinetic energy and door pressure within ASME A17.1 code requirements at all times. Electronic door detectors are to be set to fault to the open position. Maintain door nudging within ASME A17.1 code requirements.

Door Operation: Should be checked at least quarterly, cleaned and adjusted as required. Here again, cable connections if involved with possible snagging. It is important that the effect of adjustment be recognized as well as the possible interference of the safety edge as the line of projection reaches the target limits. Each scheduled inspection should include a thorough check of the ray focus and intensity under varying movement of the doors and their attachments. Check and record time settings.

- c). Door Operator: Check, lubricate, and adjust quarterly. Where geared operators are used, gear oil level should be checked and the unit drained, flushed and refilled within five (5) years. Opening motion should be at design speed with taken to avoid drag in opening action as the door reaches full open position. Drag at this position can prevent full opening varying movement of the doors and their attachments. Check and record time settings.
 - d). Door Operator: Check lubricate, and adjust quarterly. Where geared operators are used, gear oil level should be checked and the unit drained, flushed and refilled within five (5) years. Opening motion should be at design speed with smooth start, slowdown and stop, with particular care being taken to avoid drag at this position can prevent full openings of the door and drop out of the opening relay, preventing the door from closing. Closing time should be adjusted to that given herein above. Closing adjustment should permit door reversal within travel of the Saf-T-Edge as above without further drift.
4. Control:
- a). Regular inspection and adjustments as outlined herein above. The effects of control fault can be most easily detected for individual car operation by riding the unit and observing operation. At each scheduled control inspection the operation of the relays in the panel in normal service can suggest trouble areas, erratic relay operation or contact sparking. Touch up adjustment suggested by these observations can frequently avoid drift off of adjustment and a major tune up, or failure of a more serious nature. Mechanical check of relay operation can best be done with the power off testing contact pressure and wipe, as well as friction where relays appear to be sluggish. At first power cut off check frequent operating relays for overheating by touch. This should be done particularly for relays in the circuits where undue sparking is apparent. At the same time transformers and rectifiers should be checked for heat.

The rectifier voltage should be periodically checked and compared to posted values, confirming periodic check and recording variation, if any. Contacts should be found to be clean if contact wipe is sufficient, they should only be dressed if they have developed ridges, blisters, or are excessively pitted. Should this condition be beyond correction they should be replaced. On occasion pins or relay fulcrum points may give rough or sluggish relay action and may need slight lubrication or dressing. Proper values of timing relays should be posted on the relay cabinet or panel and checked at control inspection schedule. Particular attention should be paid to all overload and phase failure relays where they are used for checking adjustment and freedom of movement. A log of corrections and adjustments of each controller, studied at each scheduled inspections can be a time saver in clearing troubles and preventive maintenance adjustment. Contractor is advised that any burnout and/or fire damage to the elevator equipment due to normal equipment malfunctions or negligence in service or repair is the Contractor's responsibility.

- b). Group Supervisory Control: Should be checked quarterly for operation as in the individual car control. In addition the maintenance man should check the response time to corridor calls. This should be done by checking the time of call cancellation or a series of calls during a heavy service period, making sure that most fall within the nominal times given under performance standards. If the system should not be busy, up and down relays may be actuated from the board. In this case the time checks should be toward the lower end of the nominal time. Make sure that all cars are in service by, if necessary, placing car calls to start the mg set of each elevator. Should the response times be sluggish (above the nominal) with all cars running, it may be necessary to check all adjustments, even those required annually under performance expectations.

5. Machine Bearings, Motors, and Motor Generator Sets:

- a). Machine Bearings: Should be checked every two (2) weeks for oil leakage. Motor fields should be checked for insulation, overheating, commutators should be checked for burning and arcing. Brushes should be made of a grade that will provide good commutation without cutting or scoring.
- b). Machine Brake: Should be thoroughly cleaned, lubricated and checked for freedom of operation, at least once a year. Since this requires dismantling for a thorough inspection and lubrication, counterweights should be landed. The brake should be set to handle 125% of full load. To retain this setting, compressed length of the brake springs should be measured before dismantling and restored in reassembly. This length should be checked periodically and the spring/springs readjusted as the shoes are brought closer to the brake pulley to compensate for brake lining wear. Lining should be replaced before wear reaches a point where the brake drum could be scored. Check operation armature and its guide for excessive wear to avoid erratic brake operation.
- c). Motor MG Set: Check bearings for heating and lubrication every two (2) weeks, check brushes and commutators for wear and color. Care should be exercised in brush wear and the type brushes used. Blow out yearly, check insulation of coils and apply insulation paint every three (3) years. Dry and brittle insulation can result in burn out and fire. It must

be remembered that coils in stock can get brittle and their insulation should be examined and restored as needed.

6. Hoistway Equipment:

- a). Hoistway Switches: Should be checked for contact pressure, and wipe, quarterly where involved in the landing of the elevator, annually for all safety equipment, slowdown and limits.
- b). Safety Equipment: should be checked for freedom of movement, set by hand yearly and lubricated as required, with governor and its tension sheaves lubricated each quarter, and oil buffers should be checked for oil level yearly. Note: should the water level in the elevator pit rise above the oil reservoir, buffers should be drained, flushed and refilled.
- c). Overhead and Deflector Sheaves: Check lubrication and grooves annually, same stipulation to re-grooving and groove depth as for drive sheaves.
- d). Guide Rails and Roller Guides: Should be cleaned annually, and roller guides adjusted to rail where this is applicable. Check guide oilers, where they are used, and oil is required. Should a safety have set for any reason, rails should be examined carefully for possible scoring and filed where necessary to restore a smooth surface.
- e). Car and Corridor Stations: Should be opened each year for cleaning and the switches each examined for positive action, contact pressure, wear and wipe. All connections should be checked to see that they are tight.
- f). Cables: Should be examined every thirteen (13) weeks. Control cables or traveling conductors for cover deterioration which may be corrected by re-taping unless individual wire insulation is affected or major portions of the cover and brittle. Guards may be required to cover points which may cause traveling cable abrasion. Governor cables and hoist cables/ropes should be examined for breaks, particularly in the valley of the cable which could indicate internal breakage and ultimate strand separation. Hoist cables may need cleaning, and on occasion, added lubricant (rope dressing). Governor cables should not be lubricated in order to assure consistent settings should the governor trip.